

**MEMORANDUM**

Ref: 2001A

To: Michael Sievert, P.E.  
MJS Engineering, P.C.

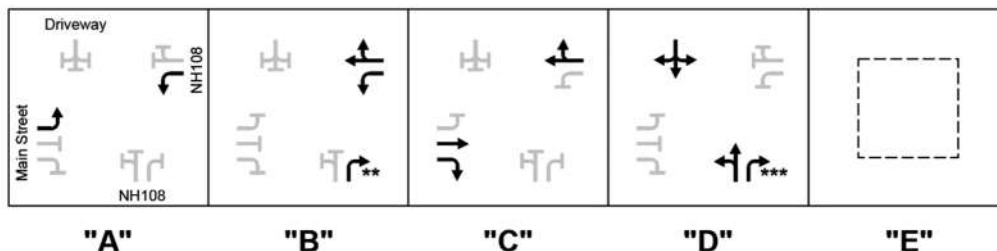
From: Stephen G. Pernaw, P.E., PTOE

Subject: Proposed Student Housing Parking - Response to Comments Supplement  
Durham, New Hampshire

Date: March 30, 2021

On March 19, 2021 our office prepared a “*Response to VHB Comments*” memorandum to address the issues that were raised by the Town’s traffic consultant. In that memorandum, we offered to conduct a supplemental field visit to view the traffic signal phasing on the Main Street eastbound approach to NH108, and to determine if the right-turn movement (Main Street to NH108 southbound) could operate during any other traffic signal phases. Our findings are summarized below:

1. According to the sequence and timing chart obtained from the NHDOT - Bureau of Traffic, this intersection (Signal ID: S-133-04) utilizes a PEEK controller in a P Type-1 cabinet that was installed in 2001 (see Attachments).
2. The existing lane configuration at this intersection is as follows:
  - Main Street EB Approach: one exclusive left-turn lane, one exclusive through lane (to NH108 NB), and one exclusive right-turn lane (to NH108 SB)
  - NH108 NB Approach: one shared left-through lane, one exclusive right-turn lane
  - NH108 WB Approach: one exclusive left-turn lane, one shared through-right lane (NH108 SB)
  - Shared Driveway SB Approach: one shared left-through-right lane
3. The existing traffic signal controller was observed to operate with five signal phases:



\*\* Right-Turn Arrow should be illuminated during Phase "B"  
 \*\*\* Right-Turn Arrow should not be illuminated during Phase "D"

4. Signal Phase “A” functions as a lead phase, however it does not occur regularly as the left-turn volume into the existing private driveway is quite low. During Phase “D” the NH108 northbound approach operates concurrently with the private driveway approach to the intersection. The exclusive pedestrian phase (Phase “E”) only occurs when the pedestrian pushbutton is activated.
5. Currently, the Main Street eastbound approach is GREEN only during Phase “C.” The eastbound right-turn lane cannot operate with a GREEN RIGHT ARROW during Phase “A” or Phase “B”, as suggested, as that would create a conflict with the westbound left-turn movement. Similarly, the eastbound right-turn lane on Main Street cannot operate with a GREEN RIGHT ARROW during Phase “D” as that would conflict with the southbound through movement from the shared driveway. Consequently, we find that signal phasing for the eastbound right-turn lane approach is appropriate given the use of concurrent signal phasing for the northbound and southbound approaches.
6. During our site inspection it was noted that drivers in the right-turn lane on the NH108 northbound approach to the signal do not see the GREEN RIGHT ARROW illuminated during Phase “B,” they only see the CIRCULAR RED indication (see Photograph 1). As a result, many of these drivers unnecessarily stop/slow, then turn right on red (RTOR). More efficient operations could be achieved by providing the northbound approach with a GREEN RIGHT ARROW during Phase “B”. Although advisable, this would not change traffic operations on the Main Street approach.
7. During our site inspection it was noted that drivers in the right-turn lane on the NH108 northbound approach to the signal are given a GREEN RIGHT ARROW during Phase “D” (see Photograph 2). We believe that the northbound right-turn movement conflicts with left-turn departures from the private driveway, and therefore a CIRCULAR GREEN indication is appropriate. Although the left-turn departure movement from the private driveway is not a heavy movement, we defer to the Bureau of Traffic.
8. During our site inspection (during a weekday PM peak period) it was noted that the eastbound through movement from Main Street (to NH108 northbound) exhibited higher demand than the eastbound right-turn movement from Main Street (to NH108 southbound). Previous counts conducted by our office (now outdated) confirmed this pattern during both the AM and PM peak hour periods. This finding suggests that any eastbound queuing on Main Street that extends back from the signalized intersection is due to the through movement, more so than the right-turn movement.

As part of our site inspection, we briefly observed traffic operations at the Main Street/Madbury Road intersection where stop sign control is installed on the Main Street westbound approach. It is our understanding that stop sign control replaced yield sign control on the Main Street approach. It was noted that several drivers roll through the intersection, rather than coming to a full stop; similar to a yield condition. Without knowing the basis for the change from yield to stop sign control, we see no compelling reason to make further modifications. In the event that stop sign control results in excessive queuing on Main Street (westbound) in the future, consideration could be given to moving the stop signs

to control the eastbound left-turn movement to Madbury Road (rather than the westbound right-turn movement) if traffic counts and analyses support this type of change.

Recommended Action Items: The town should consider sending this memorandum to the NHDOT District Six, along with a request for the Bureau of Traffic to:

1. Consider modifying the use of the GREEN RIGHT ARROW on the NH108 northbound approach to the signal.
2. Optimize the current signal timing parameters.
3. Evaluate the use of “split phasing” for the private driveway so that the Main Street eastbound right-turn movement could operate with a supplemental GREEN RIGHT ARROW when the NH108 northbound approach is GREEN.

Attachments

---



---

**NH DOT - SEQUENCE AND TIMING CHART**

---

3/18/2021 12:32:48 PM

---

**CITY/TOWN:** DURHAM

**SIGNAL ID#:** S-133-04

**LOCATION:** NH 108

**INTERSECT:** MAIN ST

---

**CABINET TYPE:** P TYPE-1

**Meter Number** 14494295  
**and Mfr:**

**CONTROLLER MFG** PEEK

**INSTALL DATE:** 2/5 /2001

---

**\*\*\*CONTROLLER TIMINGS\*\*\***

	PH 1	PH 2	PH 4	PH 5	PH 6	PH 8
<b>INITIAL</b>	5	5	5	5	5	5
<b>PASSAGE</b>	4	4	4	4	4	4
<b>YELLOW</b>	4	4	4	4	4	4
<b>ALL RED</b>	2	2	2	2	2	2
<b>MAXIMUM 1</b>	15	30	30	30	30	30
<b>MAXIMUM 2</b>						
<b>MAXIMUM 3</b>		15	15	15	15	
<b>MAXIMUM EXT</b>		45	45	45	45	
<b>RECALL</b>		SOFT		MEMON	SOFT	
<b>WALK</b>	7					
<b>DON'T WALK</b>	12					
<b>FL YEL ARROW</b>						

---

**NOTES:**

---

---

**NH DOT - SEQUENCE AND TIMING CHART**

*3/18/2021 12:32:48 PM*

---

---

EX PED ON CHT 10



1: Northbound Approach (NHH108)

During Phase “B” the GREEN RIGHT ARROW is not illuminated.



2: Northbound Approach (NH108)

During Phase “D” the GREEN RIGHT ARROW is illuminated.



3: Westbound Approach (NH108)

Phase B indications shown.





4: Eastbound Approach (Main Street)

Exclusive right-turn lane indications with RTOR sign.



5: Eastbound Approach (Main Street)

Exclusive left-turn lane and exclusive through lane indications.



6: Southbound Approach (Private Driveway)

Runs concurrently with the northbound approach.